

# ANNUAL COMPLIANCE REPORT OF MISSOURI PUBLIC WATER SYSTEMS



Hoot Owl Point Subdivision Water Treatment Plant



**MISSOURI**  
DEPARTMENT OF  
NATURAL RESOURCES

2016



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## Report Summary from the Branch Chief

Missouri is blessed with an abundance of high-quality water supplied by its many underground aquifers and major river networks. These sources provide Missourians with water not only for drinking but for a myriad of household, agricultural, industrial and other purposes. It is critical that water provided to the public be safe and abundant.

In Missouri, the Missouri Department of Natural Resources' Public Drinking Water Branch has the responsibility for implementing the Safe Drinking Water Act and ensuring that the state's 2,720 public water systems provide safe drinking water. To do this, the department sets limits and monitors for 91 different chemical and microbiological contaminants that could be found in public water supplies. This report provides information on how well Missouri's public water systems are doing in meeting these standards.

This report is the 21st Annual Compliance Report produced by the department. It contains compliance statistics for Missouri's public water systems for calendar year 2016. The department prepares this report not only to comply with statutory obligations mandated by the federal Safe Drinking Water Act, but also to focus attention and provide an understanding of the importance of quality drinking water to the public. This report is provided to the U.S. Environmental Protection Agency for inclusion in a national report that summarizes the performance of the nation's public drinking water systems. The report shows Missouri's water systems continued to provide safe and reliable drinking water, but also shows there are still remaining challenges to overcome.

In Missouri, the Revised Total Coliform Rule monitoring and implementation requirements generate the most violations. This reflects the relatively high frequency of monitoring (monthly) and the vulnerability of water systems to bacteriological contamination, as well as the fact that it is a rule that applies to every public water system. The Ground Water Rule implementation is closely aligned with the Revised Total Coliform Rule and compliance with it can also be a challenge as Missouri has a large number of very small public water systems that use well water as their source.

A significant number of systems are also experiencing difficulty complying with Disinfection Byproduct (DBP) Rule requirements. More stringent requirements under the Stage 2 Disinfection Byproduct Rule were phased in based on a system's population, starting in 2012. The Stage 2 DBP Rule also requires secondary water systems to meet the disinfection byproduct standards and all systems are now required to comply with the rule regardless of population. Since water age can exacerbate disinfection byproduct levels, there can be significant compliance hurdles for some secondary water systems to overcome.

Compliance with the annual Consumer Confidence Report requirements continues to be a challenge. The department assists the community water systems with this workload by hosting the reports on the department's website, which has dramatically helped reduce the cost to systems of meeting this requirement and has improved compliance.

Implementation of the Long Term 2 Surface Water Treatment Rule (LT2) has resulted in the need for systems to provide additional treatment. In recently completed second round of source water monitoring for cryptosporidium (crypto) by the 10 largest surface water treatment plants, three additional plants detected crypto at sufficient levels to have to install additional treatment. With the second and final round of source water monitoring complete, seven plants will have to or have already upgraded their treatment to protect against crypto.

And finally, the Lead and Copper Rule continues to receive national attention. The branch continues to put a lot of effort into ensuring system compliance with the Lead and Copper Rule through ongoing monitoring, education and technical assistance. In general, Missouri's large water systems have lime softening plants that add calcium and produce stable water and our groundwater systems that rely on wells to supply the water draw from aquifers that normally produce very hard water that is not corrosive and is unlikely to leach lead from the distributions system.

Going forward, we know there are still several challenges ahead in getting every system into compliance with all applicable standards. However, we will continue to work with Missouri's water systems to help them to address their compliance issues so that they can continue to provide Missouri's citizens with access to safe and reliable drinking water.

I hope you find this report informative and useful.

A handwritten signature in dark ink, appearing to read "David J. Lamb".

David J. Lamb, Chief  
Public Drinking Water Branch  
Missouri Department of Natural Resources



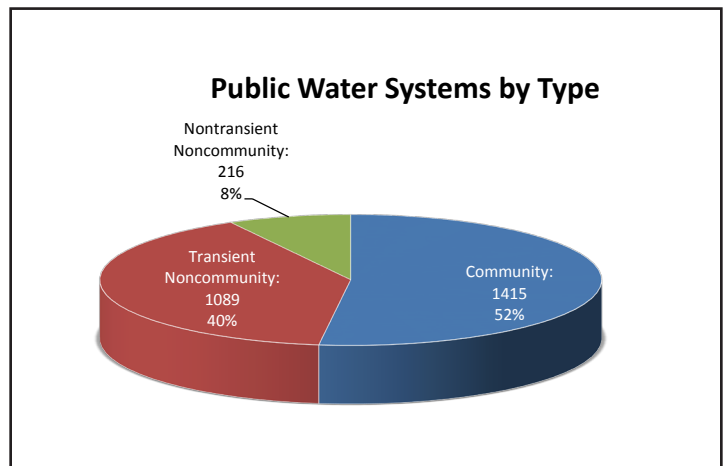
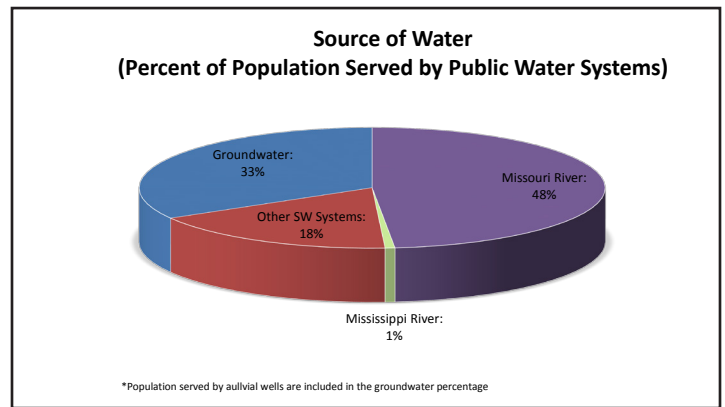
# What is a Public Water System?

A public water system is defined as a system that provides water through piping or other constructed conveyances for human consumption to at least 15 service connections, or serves an average of at least 25 people for at least 60 days each year. These are the systems that are the focus of this report.

There are three types of public water systems:

1. Community systems include towns, water districts, subdivisions, mobile home parks and residential facilities such as nursing homes or prisons.
2. Nontransient noncommunity systems regularly serves at least 25 of the same people during six months per year; schools and factories are good examples.
3. Transient noncommunity systems serve different people daily, such as restaurants, resorts and campgrounds. These smaller systems are typically in rural areas where it is not feasible to hook up to a city or water district.

Requirements for construction, operation, monitoring, etc., vary among systems based on their type, size and source of water. Water testing at systems that are not public water systems (for example, homes served by private wells) is facilitated by local and county sanitarians and the Missouri Department of Health and Senior Services, rather than the Missouri Department of Natural Resources.



## The Missouri Public Water System Universe

In 2016, there were 2,720 active public water systems in Missouri. Of this total, 1,415 were community, 216 were nontransient noncommunity, and 1,089 were transient noncommunity systems.

The community water systems in Missouri served more than 5 million citizens in 2016. These citizens benefit from one of Missouri's most outstanding resources: its water. There is generally a large quantity of high-quality water in Missouri.

By far the largest source of drinking water for Missourians is surface water from the Missouri River. The abundant supply of water in the Missouri River and its proximity to the state's major population centers make the use of this river as a source so popular.

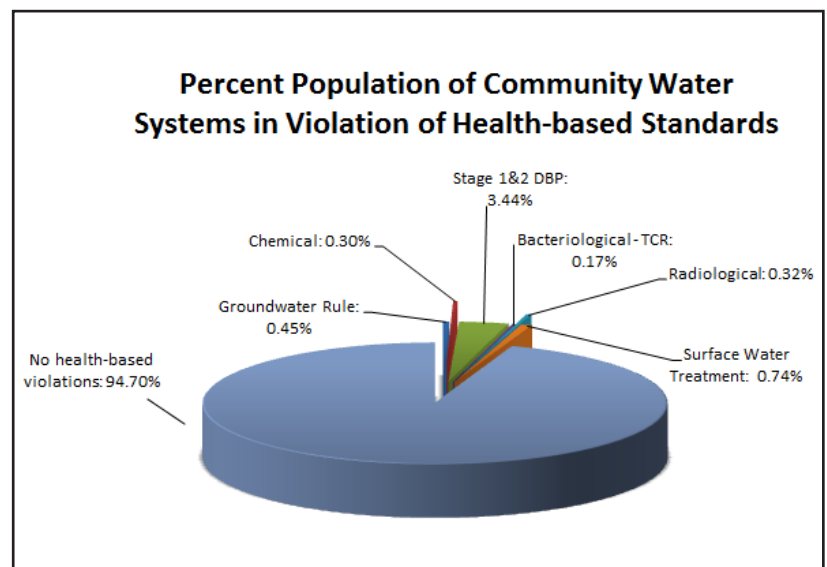
Groundwater is the next most used source of drinking water for Missouri's community supplies. In southern Missouri, good quality groundwater is easy to obtain and typically requires very little treatment to be used for drinking water. Some groundwater systems have the best of both worlds and use alluvial wells in valleys of the Missouri and Mississippi river systems where they can get large volumes of water free of surface contaminants. Wells in the Missouri River alluvium provide groundwater to a significant population. More than half the state's population gets their drinking water from the Missouri River or its alluvial wells. The importance of this resource cannot be overstated.

## Analysis of Compliance

Missouri expects a lot from its public water systems and requires testing for 91 different regulated chemicals and microbiological contaminants on a regular schedule. A system is to be applauded for performing all required testing and meeting all Maximum Contaminant Level (MCLs), and treatment technique standards. When violations do occur, that often is the first identification of a problem and can be the first step toward correcting it. Many public water systems perform testing beyond what is required by the state.

The Summary of Violations table in this report counts individual violations. Each public water system has the potential to accumulate multiple violations during the year because there are multiple regulations involved and some monitoring is on a monthly schedule. For example, the monitoring requirements for the Total Coliform Rule alone create a potential for more than 30,000 violations. This puts some perspective on the violation figures shown in the Summary of Violations table and the information in the appendices. Another factor to consider is the number of systems that have violations. Many of the violations are from water systems with problems that result in multiple violations during the year. Other systems may only have one or two violations.

Appendices A through C list specific systems by county. The department uses various methods to focus on the water systems that need attention. The department used a process for many years developed by the Environmental Protection Agency (EPA) to identify significant noncompliers. State regulators were critical of this process because it weighted monitoring and reporting violations as much as health-based violations. As a result, EPA developed a new enforcement response policy that focuses on health-based violations. This new policy includes an enforcement targeting tool that tracks systems with the highest levels of noncompliance. The new policy and tool identify priority systems for enforcement response, define timely and appropriate enforcement responses and clarify what constitutes a formal action.

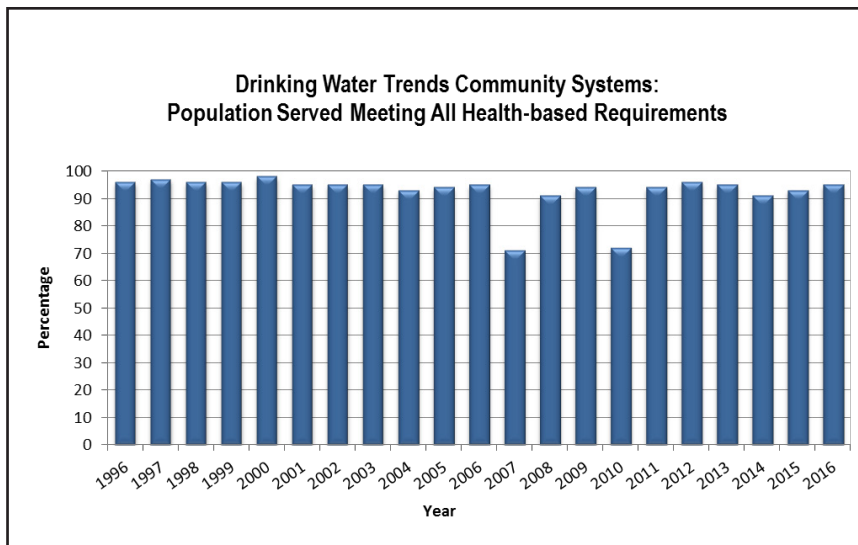


MCL and treatment technique violations represent the most significant impact on public health. These occurred at a small number of public water systems serving approximately 5.3 percent of the population. Since 1996, when the first Annual Compliance Report was produced, through 2003, Missouri has consistently met or exceeded EPA's target of serving water that meets all health-based standards to 95 percent of the population. Again in 2006, Missouri community water systems met EPA's target. The small dip below the 95 percent target in 2004 and 2005 did not represent a reduction in water quality, but is a result of more stringent drinking water standards. In 2007, this compliance measure dropped significantly because Missouri's largest water system had a treatment technique violation. The same phenomenon happened again in 2010. Even though these events were of short duration, the entire population had to be counted in this statistic. For more information on this item, refer to the 2008 Annual Compliance Report.

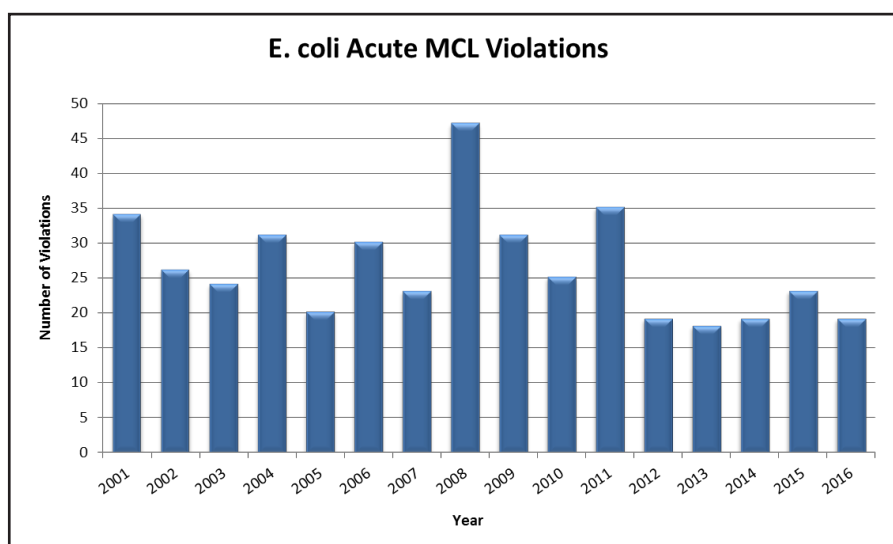
EPA and the states have worked together to develop an additional compliance measure called "person-months during which community water systems provide water that meets health-based standards." This measure is intended to take into account situations where violations are of short duration. Missouri achieved 95.31 percent compliance with this measure in 2016. The national target for federal fiscal year 2016 was 95 percent.

The majority of MCL and monitoring violations in 2016 were for failure to meet the requirements of

the Total Coliform Rule and the Revised Total Coliform Rule. Total coliform bacteria serve as an indicator that disease-causing organisms may be present. All public water systems in the state must test for this type of bacteria every month they dispense water to the public. Monitoring violations are by far the most common violation for this rule. The department is particularly concerned when monitoring violations occur at public water systems that have a history of bacteriological contamination. Adequate testing is the only way to know for sure if the problems have been corrected or have reoccurred.



In 2016, 17 public water systems, 0.7 percent, had acute violations for E. coli.



Another way to look at the number of acute MCL violations is to compare the number that actually occurred to the number possible. Since bacteriological testing is required monthly, the 2,720 water systems had more than 30,000 chances to get an E. coli MCL violation. The 19 that actually occurred represent less than 1 percent of the number possible. While these acute violations can be serious, they are rare.

## Consumer Confidence Reports

Some people may be more vulnerable to waterborne illness than the general population. To educate the public on this issue, community water systems include a warning in their annual Consumer Confidence Reports (CCR) stating that some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as those with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections.

CCRs provide detailed information for individual community water systems, while this report does not. Community water systems must distribute the CCR annually to water customers detailing specific information about their water system. This includes information about the source(s) and the levels of contaminants in the drinking water. Usually, these contaminants pose no health threat or are below the MCL and are not violations. The CCR must list violations of state and federal requirements for the calendar year. The department prepares a draft CCR for water systems to review and utilize and posts this on its server at [dnr.mo.gov/ccr/index.html](http://dnr.mo.gov/ccr/index.html) along with additional information regarding CCRs. The department also hosts the final CCR version and

provides a unique URL web address for water customers to access the report for each system. As a result of these efforts, CCR compliance rates increased over the previous year. In 2016, 94.6 percent of Missouri's community water systems distributed their Consumer Confidence Reports properly.

Anyone can request a copy of their CCR from their public water system or by calling the department's Public Drinking Water Branch at 800-361-4827 or 573-751-5331.

## Compliance Activities: Preserving the Quality of Drinking Water

The department works closely with violators to return them to compliance in a timely manner. This includes phone contacts, on-site inspections, meetings with owners or operators and technical assistance as needed. For more serious violations, a bilateral compliance agreement between the water system owner and the department may be the tool used to return the system back into compliance. Bilateral compliance agreements are voluntary written agreements negotiated between the system owner and department's regional office. This process allows the department to determine the improvements the water system needs to make without either party having to endure the time and cost of formal litigation. If a water system owner or operator violates a bilateral compliance agreement or a drinking water law or regulation, the department may take additional enforcement actions, such as issuing an administrative order.

Public Drinking Water Branch staff work in conjunction with other agencies to protect public health. By serving on a committee with staff from the Missouri Department of Health and Senior Services, the two agencies identify ways to support and benefit each other's activities. One of those areas is enforcement activity against facilities, such as restaurants, that are regulated by both agencies.

The department provides training and technical assistance in an effort to prevent the occurrence of violations. Training is routinely provided to operators and owners of public water systems around the state, primarily concentrating on the basic principles of running a water system, performing the required monitoring and preventing contamination of the system. Technical assistance in the form of phone contacts and on-site visits is also available to help water system operators avoid or correct problems. Staff in the department's regional and satellite offices carry out most of these activities.

For most violations, public water systems are required to notify the consumers they serve. The department provides all public water systems with the necessary forms and information to effectively notify the public. The method of notification varies by the violation and system type. Systems must report back to the department how the public notice was performed. Some violations, such as the confirmed detection of E. coli, warrant immediate action due to the threat to public health. For such acute violations, the department requires systems to notify customers within 24 hours to boil water before consumption. Boil water orders remain in effect until the problem has been corrected and the water is safe to consume.

## For More Information

Information about Missouri's public water systems can be obtained by writing to the Missouri Department of Natural Resources, Public Drinking Water Branch, PO Box 176, Jefferson City, MO 65102-0176 or calling 800-361-4827 or 573-751-5331.

Information is also available on the department's website at [dnr.mo.gov/env/wpp/dw-index.html](http://dnr.mo.gov/env/wpp/dw-index.html).



# Summary of Violations Table

The following definitions apply to the Summary of Violations table.

**Filtered Systems:** Water systems that have installed filtration treatment [10 CSR 60-4.050].

**Inorganic Contaminants:** Non-carbon-based compounds such as metals, nitrates and asbestos. These contaminants are naturally-occurring in some water, but can get into water through farming, chemical manufacturing and other human activities [10 CSR 60-4.030].

**Lead and Copper Rule:** Lead and copper corrosion pose various health risks when ingested at any level, and can enter drinking water from household pipes and plumbing fixtures [10 CSR 60, Chapter 15]. Violations are reported for: failure to monitor; failure to install optimal corrosion control treatment or a source water treatment system that would reduce lead and copper levels in water at the tap; failure to replace lead service lines on the schedule required by the regulation; and failure to provide required public education about reducing or avoiding lead intake from drinking water.

**Organic Contaminants:** Carbon-based compounds, such as industrial solvents and pesticides. These contaminants generally get into water through runoff from cropland or discharge from factories [10CSR 60-4.040 and 4.100].

**Radionuclides:** Radioactive particles that can occur naturally in water or result from human activity. Safe drinking water regulations set MCLs on five types of radionuclides: radium-226, radium-228, uranium, gross alpha and beta particle/photon radioactivity [10 CSR 60-4.060].

**Surface Water Treatment Rule:** This includes a series of rules promulgated from 1989-2009 that establish criteria under which water systems supplied by surface water sources, or groundwater sources under the direct influence of surface water, must filter and disinfect their water (Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, Long Term 1 Enhanced Surface Water Treatment Rule, Long Term 2 Enhanced Surface Water Treatment Rule) [10 CSR 60-4.050 and 60-4.052].

Violations of the surface water treatment rules are reported for the following categories:

- **Monitoring, routine/repeat (for filtered systems):** Failure to carry out required tests or to report the results of those tests. A major monitoring violation for the surface water treatment rule occurs when at least 90 percent of the required samples are not taken or results are not reported during the compliance period.
- **Treatment techniques (for filtered systems):** Failure to properly treat the water.
- **Total Coliform Rule (TCR) and Revised Total Coliform Rule (RTCR):** The TCR and RTCR, establishes regulations for microbiological contaminants in drinking water. These contaminants can cause a short-term health problem. If no samples are collected during the one-month compliance period, a major monitoring violation occurs. States report four categories of violations to EPA:
  1. **Acute MCL violation:** A violation where the system found E. coli, potentially harmful bacteria, in its water.
  2. **Non-acute MCL violation:** A violation where the system found total coliform in samples of its water at a frequency or at a level that violates the rule. For systems collecting fewer than 40 samples per month, more than one positive sample for total coliform is a violation. For systems collecting 40 or more samples per month, more than five percent of the samples positive for total coliform is a violation.
  3. **Major routine and follow-up monitoring:** A violation where a system did not perform any monitoring.
  4. **Sanitary Survey:** A major monitoring violation if a system fails to collect five routine monthly samples if sanitary survey is not performed.

**Maximum Contaminant Level:** The highest amount of a contaminant allowed in drinking water. MCLs ensure drinking water does not pose a health risk. MCLs are defined in milligrams per liter (parts per million) unless otherwise specified.

**Monitoring:** The department specifies which water testing methods the water systems must use and sets schedules for the frequency of testing. A water system that does not follow the department's schedule or methodology is in violation [10 CSR 60-4.010]. States must report monitoring violations that are significant as determined by the EPA Administrator, in consultation with the department. For purposes of this report, significant monitoring violations are major violations and they occur when no samples are taken or no results are reported during a compliance period.

**Ground Water Rule:** Applies to public water systems that serve groundwater. It ensures monitoring of groundwater sources for E. coli contamination, and relies on four strategies to address this risk: periodic sanitary surveys, triggered source water monitoring in the case of a positive sample, corrective action for a system found to have a significant deficiency or source water E. coli contamination, and compliance monitoring to ensure the treatment technology is reliable.

**Treatment Techniques:** A water disinfection process that EPA requires instead of a MCL for contaminants that laboratories cannot adequately measure. Failure to meet other operational and system requirements under the Surface Water Treatment and the Lead and Copper Rules have also been included in this category of violation for purposes of this report.

**Violation:** A failure to meet any state or federal drinking water regulation.



## Organic Contaminants: Jan. 1, 2016 - Dec. 31, 2016

|                           |                            | MCL                  |                                   | Treatment Technique  |                                   | Significant          |                                   |
|---------------------------|----------------------------|----------------------|-----------------------------------|----------------------|-----------------------------------|----------------------|-----------------------------------|
|                           | MCL <sup>1</sup><br>(mg/L) | No. of<br>Violations | No. of Systems<br>with Violations | No. of<br>Violations | No. of Systems<br>with Violations | No. of<br>Violations | No. of Systems<br>with Violations |
| Organic Contaminants      |                            |                      |                                   | *                    |                                   |                      |                                   |
| 1,1,1-Trichloroethane     | 0.2                        |                      |                                   |                      |                                   | 12                   | 12                                |
| 1,1,2-Trichloroethane     | 0.005                      |                      |                                   |                      |                                   | 12                   | 12                                |
| 1,1-Dichloroethylene      | 0.007                      |                      |                                   |                      |                                   | 12                   | 12                                |
| 1,2,4-Trichlorobenzene    | 0.07                       |                      |                                   |                      |                                   | 12                   | 12                                |
| 1,2-DBCP                  | 0.0002                     |                      |                                   |                      |                                   |                      |                                   |
| 1,2-Dichloroethane        | 0.005                      |                      |                                   |                      |                                   | 12                   | 12                                |
| 1,2-Dichloropropane       | 0.005                      |                      |                                   |                      |                                   | 12                   | 12                                |
| 2,3,7,8-TCDD (Dioxin)     | 3x10-8                     |                      |                                   |                      |                                   |                      |                                   |
| 2,4,5-TP                  | 0.05                       |                      |                                   |                      |                                   |                      |                                   |
| 2,4-D                     | 0.07                       |                      |                                   |                      |                                   |                      |                                   |
| Acrylamide                |                            |                      |                                   |                      |                                   |                      |                                   |
| Alachlor                  | 0.002                      |                      |                                   |                      |                                   |                      |                                   |
| Aldicarb                  | 0.003                      |                      |                                   |                      |                                   |                      |                                   |
| Aldicarb Sulfone          | 0.002                      |                      |                                   |                      |                                   |                      |                                   |
| Aldicarb Sufoxide         | 0.004                      |                      |                                   |                      |                                   |                      |                                   |
| Atrazine                  | 0.003                      |                      |                                   |                      |                                   |                      |                                   |
| Benzene                   | 0.005                      |                      |                                   |                      |                                   | 12                   | 12                                |
| Benzo[a]pyrene            | 0.0002                     |                      |                                   |                      |                                   |                      |                                   |
| BHC Gamma                 | 0.0002                     |                      |                                   |                      |                                   |                      |                                   |
| Carbofuran                | 0.04                       |                      |                                   |                      |                                   |                      |                                   |
| Carbon tetrachloride      | 0.005                      |                      |                                   |                      |                                   | 12                   | 12                                |
| Chlorobenzene             | 0.1                        |                      |                                   |                      |                                   | 12                   | 12                                |
| Chlordane                 | 0.002                      |                      |                                   |                      |                                   |                      |                                   |
| cis-1,2-Dichloroethylene  | 0.07                       |                      |                                   |                      |                                   | 12                   | 12                                |
| Dalapon                   | 0.2                        |                      |                                   |                      |                                   |                      |                                   |
| Di(2-ethylhexyl)adipate   | 0.4                        |                      |                                   |                      |                                   |                      |                                   |
| Di(2-ethylhexyl)phthalate | 0.006                      |                      |                                   |                      |                                   |                      |                                   |
| Dichloromethane           | 0.005                      |                      |                                   |                      |                                   | 12                   | 12                                |
| Dinoseb                   | 0.007                      |                      |                                   |                      |                                   |                      |                                   |
| Diquat                    | 0.02                       |                      |                                   |                      |                                   |                      |                                   |
| Endothall                 | 0.1                        |                      |                                   |                      |                                   |                      |                                   |
| Endrin                    | 0.002                      |                      |                                   |                      |                                   |                      |                                   |
| Epichlorohydrin           |                            |                      |                                   |                      |                                   |                      |                                   |
| Ethylbenzene              | 0.7                        |                      |                                   |                      |                                   | 12                   | 12                                |
| Ethylene dibromide        | 0.00005                    |                      |                                   |                      |                                   |                      |                                   |
| Glyphosate                | 0.7                        |                      |                                   |                      |                                   |                      |                                   |
| Heptachlor                | 0.0004                     |                      |                                   |                      |                                   |                      |                                   |

<sup>1</sup> Values are in milligrams per liter (mg/L), unless otherwise specified.

\*Shaded areas indicate a violation is not applicable in this category.

## Organic Contaminants: Jan. 1, 2016 - Dec. 31, 2016

|                            |                            | MCL                  |                                   | Treatment Technique  |                                   | Significant Monitoring/Reporting |                                   |
|----------------------------|----------------------------|----------------------|-----------------------------------|----------------------|-----------------------------------|----------------------------------|-----------------------------------|
|                            | MCL <sup>1</sup><br>(mg/L) | No. of<br>Violations | No. of Systems<br>with Violations | No. of<br>Violations | No. of Systems<br>with Violations | No. of<br>Violations             | No. of Systems with<br>Violations |
| Heptachlor epoxide         | 0.0002                     |                      |                                   |                      |                                   |                                  |                                   |
| Hexachlorobenzene          | 0.05                       |                      |                                   |                      |                                   |                                  |                                   |
| Hexachlorobenzene          | 0.001                      |                      |                                   |                      |                                   |                                  |                                   |
| Hexachlorocyclopentadiene  | 0.05                       |                      |                                   |                      |                                   |                                  |                                   |
| Lasso                      | 0.05                       |                      |                                   |                      |                                   |                                  |                                   |
| Lindane                    | 0.0002                     |                      |                                   |                      |                                   |                                  |                                   |
| Methoxychlor               | 0.04                       |                      |                                   |                      |                                   |                                  |                                   |
| Monochlorobenzene          | 0.1                        |                      |                                   |                      |                                   |                                  |                                   |
| o-Dichlorobenzene          | 0.6                        |                      |                                   |                      |                                   | 12                               | 12                                |
| Oxamyl (Vydate)            | 0.2                        |                      |                                   |                      |                                   | 12                               | 12                                |
| Para-Dichlorobenzene       | 0.075                      |                      |                                   |                      |                                   |                                  |                                   |
| Pentachlorophenol          | 0.001                      |                      |                                   |                      |                                   |                                  |                                   |
| Picloram                   | 0.5                        |                      |                                   |                      |                                   |                                  |                                   |
| Simazine                   | 0.004                      |                      |                                   |                      |                                   |                                  |                                   |
| Styrene                    | 0.1                        |                      |                                   |                      |                                   | 12                               | 12                                |
| Tetrachloroethylene        | 0.005                      |                      |                                   |                      |                                   | 12                               | 12                                |
| Toluene                    | 1                          |                      |                                   |                      |                                   | 12                               | 12                                |
| Total PCB                  | 0.0005                     |                      |                                   |                      |                                   |                                  |                                   |
| Toxaphene                  | 0.003                      |                      |                                   |                      |                                   |                                  |                                   |
| Trans-1,2-Dichloroethylene | 0.1                        |                      |                                   |                      |                                   | 12                               | 12                                |
| Trichloroethylene          | 0.005                      |                      |                                   |                      |                                   | 12                               | 12                                |
| Vinyl chloride             | 0.002                      |                      |                                   |                      |                                   | 12                               | 12                                |
| Xylenes (total)            | 10                         |                      |                                   |                      |                                   | 12                               | 12                                |

<sup>1</sup> Values are in milligrams per liter (mg/L), unless otherwise specified

## Disinfection Byproducts Rule: Jan. 1, 2016 - Dec. 31, 2016

|  |      | MCL                  |                                  | Treatment Techniques |                                  | Significant Monitoring/Reporting |                                  |
|--|------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------------------|----------------------------------|
|  | MCL  | No. of<br>Violations | No. of Systems<br>with Violation | No. of<br>Violations | No. of Systems<br>with Violation | No. of<br>Violations             | No. of Systems<br>with Violation |
| Total trihalomethanes                  | 0.80 | 163                  | 71                               |                      |                                  | 15                               | 14                               |
| Haloacetic acids                       | 0.60 | 13                   | 7                                |                      |                                  | 15                               | 14                               |
| Disinfection byproducts                |      | 176                  | 72                               | 0                    | 0                                | 15                               | 14                               |
| Total Organic Compounds                |      |                      |                                  | 0                    | 0                                |                                  |                                  |
| Insufficient or Non-certified Operator |      |                      |                                  | 0                    | 0                                |                                  |                                  |



## Inorganic Contaminants: Jan. 1, 2016 - Dec. 31, 2016

|                           |                    | MCL               |                                | Treatment Technique |                                | Significant Monitoring/Reporting |                                |
|---------------------------|--------------------|-------------------|--------------------------------|---------------------|--------------------------------|----------------------------------|--------------------------------|
|                           | MCL (mg/L)         | No. of Violations | No. of Systems with Violations | No. of Violations   | No. of Systems with Violations | No. of Violations                | No. of Systems with Violations |
| Inorganic Contaminants    |                    |                   |                                |                     |                                |                                  |                                |
| Antimony                  | 0.006              |                   |                                |                     |                                | 8                                | 8                              |
| Arsenic                   | 0.010              | 1                 | 1                              |                     |                                | 8                                | 8                              |
| Asbestos                  | 7 million fibers/L |                   |                                |                     |                                |                                  |                                |
| Barium                    | 2                  |                   |                                |                     |                                | 8                                | 8                              |
| Beryllium                 | 0.004              |                   |                                |                     |                                | 8                                | 8                              |
| Cadmium                   | 0.005              |                   |                                |                     |                                | 8                                | 8                              |
| Chromium                  | 0.1                |                   |                                |                     |                                | 8                                | 8                              |
| Cyanide (as free cyanide) | 0.2                |                   |                                |                     |                                | 2                                | 2                              |
| Fluoride                  | 4.0                | 4                 | 1                              |                     |                                | 8                                | 8                              |
| Mercury                   | 0.002              |                   |                                |                     |                                | 8                                | 8                              |
| Nitrate                   | 10 (as nitrogen)   |                   |                                |                     |                                | 37                               | 36                             |
| Nitrite                   | 1 (as nitrogen)    |                   |                                |                     |                                |                                  |                                |
| Selenium                  | 0.05               |                   |                                |                     |                                | 8                                | 8                              |
| Thallium                  | 0.002              | 3                 | 1                              |                     |                                | 8                                | 8                              |
| Total nitrate and nitrite | 10 (as nitrogen)   |                   |                                |                     |                                | 0                                | 0                              |

## Radiological Contaminants: Jan. 1, 2016 - Dec. 31, 2016

|                           |                             | MCL                  |                                   | Treatment Technique  |                                   | Significant Monitoring/Reporting |                                   |
|---------------------------|-----------------------------|----------------------|-----------------------------------|----------------------|-----------------------------------|----------------------------------|-----------------------------------|
|                           | MCL <sup>1</sup><br>(pCi/L) | No. of<br>Violations | No. of Systems<br>with Violations | No. of<br>Violations | No. of Systems<br>with Violations | No. of<br>Violations             | No. of Systems<br>with Violations |
| Radiological Contaminants |                             |                      |                                   |                      |                                   |                                  |                                   |
| Gross Alpha               | 15pCi/L                     | 15                   | 7                                 |                      |                                   | 8                                | 5                                 |
| Radium-226 and radium-228 | 5 pCi/L                     | 26                   | 8                                 |                      |                                   | 8                                | 5                                 |
| Gross beta                | 4 mrem/yr                   |                      |                                   |                      |                                   |                                  |                                   |
| Subtotal                  |                             | 41                   | 10                                |                      |                                   | 16                               | 5                                 |

## Surface Water Treatment Rule: Jan. 1, 2016 - Dec. 31, 2016

|                            |     | MCL               |                               | Treatment Technique |                               | Significant Monitoring/Reporting |                               |
|----------------------------|-----|-------------------|-------------------------------|---------------------|-------------------------------|----------------------------------|-------------------------------|
|                            | MCL | No. of Violations | No. of Systems with Violation | No. of Violations   | No. of Systems with Violation | Number of Violations             | No. of Systems with Violation |
| Surface Water Treatment    |     |                   |                               |                     |                               |                                  |                               |
| Filtered systems           |     |                   |                               |                     |                               |                                  |                               |
| Monitoring, routine/repeat |     |                   |                               |                     |                               | 3                                | 2                             |
| Treatment techniques       |     |                   |                               | 19                  | 5                             |                                  |                               |
| Unfiltered systems         |     |                   |                               |                     |                               |                                  |                               |
| Monitoring, routine/repeat |     |                   |                               |                     |                               |                                  |                               |
| Failure to filter          |     |                   |                               |                     |                               |                                  |                               |
| Subtotal                   |     |                   |                               | 19                  | 5                             | 3                                | 2                             |

## Microbiological Contaminants: Jan. 1, 2016 - Dec. 31, 2016

|   |                      | MCL               |                                | Treatment Technique  |                                | Significant Monitoring/Reporting |                                |
|---|----------------------|-------------------|--------------------------------|----------------------|--------------------------------|----------------------------------|--------------------------------|
|   | MCL Presence/Absence | No. of Violations | No. of Systems with Violations | Number of Violations | No. of Systems with Violations | Number of Violations             | No. of Systems with Violations |
| Total Coliform Rule (In effect 1/1/2016-3/31/2016)          |                      |                   |                                |                      |                                |                                  |                                |
| Acute MCL violation   | Presence             | 4                 | 4                              |                      |                                |                                  |                                |
| Non-acute MCL violation                                     | Presence             | 47                | 38                             |                      |                                |                                  |                                |
| Major routine and follow up                                 |                      |                   |                                |                      |                                | 117                              | 97                             |
| Sanitary survey <sup>3</sup>                                |                      |                   |                                |                      |                                |                                  |                                |
| Subtotal <sup>4</sup>                                       |                      | 47                | 38                             |                      |                                | 117                              | 97                             |
|   |                      |                   |                                |                      |                                |                                  |                                |
| Revised Total Coliform Rule (In effect 4/1/2016-12/31/2016) |                      |                   |                                |                      |                                |                                  |                                |
| Acute MCL violation   | Presence             | 15                | 14                             |                      |                                |                                  |                                |
| Level 1 Assessment Violation                                |                      |                   |                                | 10                   | 10                             |                                  |                                |
| Level 2 Assessment Violation                                |                      |                   |                                | 0                    | 0                              |                                  |                                |
| Treatment Technique, Other                                  |                      |                   |                                | 0                    | 0                              |                                  |                                |
| Major Routine   |                      |                   |                                |                      |                                | 463                              | 292                            |
| Reporting/Notification                                      |                      |                   |                                |                      |                                | 2                                | 2                              |
| Subtotal  |                      | 15                | 14                             | 10                   | 10                             | 465                              | 293                            |

<sup>1</sup> Values are in Picocuries per liter (pCi/L), unless otherwise specified.

<sup>2</sup> Some systems may have violations in multiple categories.

<sup>3</sup> Number of violations for failure to perform sanitary survey under the Total Coliform Rule.

<sup>4</sup> All Systems with an acute MCL violation also had a non-acute monthly MCL violation for the same month.

## Lead and Copper Rule: Jan. 1, 2016 - Dec. 31, 2016

|   |     | MCL               |                               | Treatment Technique |                               | Significant Monitoring/Reporting |                               |
|---|-----|-------------------|-------------------------------|---------------------|-------------------------------|----------------------------------|-------------------------------|
|   | MCL | No. of Violations | No. of Systems with Violation | No. of Violations   | No. of Systems with Violation | No. of Violations                | No. of Systems with Violation |
| Lead and Copper Rule <sup>1</sup>                                 |     |                   |                               |                     |                               |                                  |                               |
| Initial lead and copper tap monitoring and reporting              |     |                   |                               |                     |                               | 1                                | 1                             |
| Follow-up or routine lead and copper tap monitoring and reporting |     |                   |                               |                     |                               | 14                               | 14                            |
| Treatment installation  |     |                   |                               |                     |                               |                                  |                               |
| Public education  |     |                   |                               |                     |                               | 18                               | 18                            |
| Subtotal  |     |                   |                               |                     |                               | 33                               | 33                            |

<sup>1</sup> Includes any system not up to date on lead and copper monitoring. Not comparable with Annual Compliance Report figures from 2016

## Public Notification: Jan. 1, 2016 - Dec. 31, 2016

|  |     | MCL               |                               | Treatment Techniques |                               | Significant Monitoring/Reporting |                               |
|--|-----|-------------------|-------------------------------|----------------------|-------------------------------|----------------------------------|-------------------------------|
|  | MCL | No. of Violations | No. of Systems with Violation | No. of Violations    | No. of Systems with Violation | No. of Violations                | No. of Systems with Violation |
| Public Notification                      |     |                   |                               |                      |                               | 441                              | 232                           |
| Consumer Confidence Reports <sup>1</sup> |     |                   |                               |                      |                               | 76                               | 76                            |
| Subtotal                                 |     |                   |                               |                      |                               | 517                              | 259                           |

<sup>1</sup> Violations for failure to produce and distribute the 2015 Consumer Confidence Report in 2016

## Ground Water Rule: Jan. 1, 2016 - Dec. 31, 2016

|  |     | MCL               |                               | Treatment Technique |                               | Significant Monitoring/Reporting |                               |
|--|-----|-------------------|-------------------------------|---------------------|-------------------------------|----------------------------------|-------------------------------|
|  | MCL | No. of Violations | No. of Systems with Violation | No. of Violations   | No. of Systems with Violation | No. of Violations                | No. of Systems with Violation |
| Groundwater Rule                       |     |                   |                               |                     |                               |                                  |                               |
| Failure to treat                       |     |                   |                               | 10                  | 7                             |                                  |                               |
| Failure to address contamination       |     |                   |                               | 0                   | 0                             |                                  |                               |
| Failure to address deficiency          |     |                   |                               | 24                  | 24                            |                                  |                               |
| Public Notice                          |     |                   |                               |                     |                               | 5                                | 2                             |
| Sanitary Survey                        |     |                   |                               |                     |                               | 18                               | 18                            |
| Major routine and follow up monitoring |     |                   |                               |                     |                               | 91                               | 56                            |
| Subtotal                               |     |                   |                               | 34                  | 31                            | 114                              | 74                            |



## Appendix A: Health Based Compliance

### I. Total Coliform Rule

#### A. Acute MCL Violations

The following systems were under boil water orders due to acute MCL violations for fecal coliform or E. coli bacteria for the months listed. These acute violations also violate the standard for total coliform bacteria.

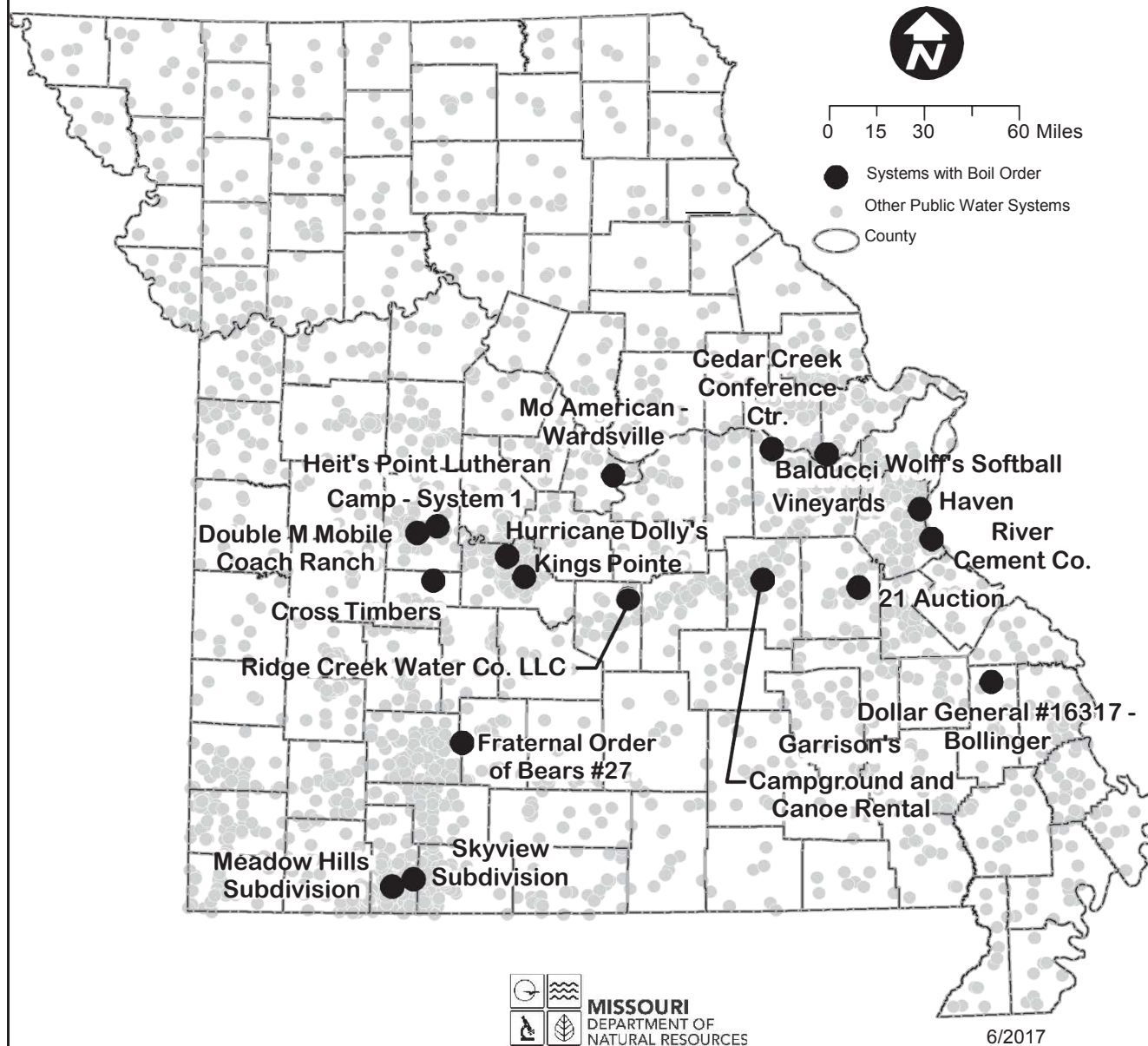
| County     | ID#       | System Name                           | Month(s) | Issue Date | Rescind Date |
|------------|-----------|---------------------------------------|----------|------------|--------------|
| BENTON     | MO3048043 | DOUBLE M MOBILE COACH RANCH           | July     | 7/21/2016  | 9/6/2016     |
| BENTON     | MO3048043 | DOUBLE M MOBILE COACH RANCH           | December | 12/29/2016 | 1/3/2017     |
| BENTON     | MO3242078 | HEITS POINT LUTHERAN CAMP SYSTEM 1    | January  | 2/10/2016  | 3/18/2016    |
| BENTON     | MO3242078 | HEITS POINT LUTHERAN CAMP SYSTEM 1    | April    | 5/6/2016   | 5/25/2016    |
| BOLLINGER  | MO4283197 | DOLLAR GENERAL 16317 BOLLINGER        | May      | 5/18/2016  | 7/1/2016     |
| CAMDEN     | MO3218012 | HURRICANE DOLLYS                      | June     | 7/7/2016   | 7/18/2016    |
| CAMDEN     | MO5193158 | KINGS POINTE                          | July     | 7/28/2016  | 9/23/2016    |
| COLE       | MO3010831 | MO AMERICAN - WARDSVILLE              | May      | 5/12/2016  | 5/18/2016    |
| CRAWFORD   | MO3241036 | GARRISONS CAMPGROUND AND CANOE RENTAL | May      | 5/21/2016  | 5/27/2016    |
| FRANKLIN   | MO6192601 | CEDAR CREEK CONFERENCE CENTER         | June     | 6/8/2016   | 6/15/2016    |
| HICKORY    | MO5010197 | CROSS TIMBERS                         | August   | 8/19/2016  | 9/2/2016     |
| JEFFERSON  | MO6180934 | RIVER CEMENT COMPANY                  | August   | 8/18/2016  | 9/14/2016    |
| JEFFERSON  | MO6203139 | WOLFFS SOFTBALL HAVEN                 | June     | 6/18/2015  | Ongoing      |
| PULASKI    | MO4031631 | RIDGE CREEK WATER COMPANY LLC         | January  | 1/21/2016  | 2/8/2016     |
| ST CHARLES | MO6213173 | BALDUCCI VINEYARDS                    | August   | 9/8/2016   | 9/19/2016    |
| STONE      | MO5031142 | MEADOW HILLS SUBDIVISION              | October  | 10/24/2016 | 11/4/2016    |
| STONE      | MO5031613 | SKYVIEW SUBDIVISION                   | March    | 4/10/2013  | 8/8/2016     |
| WASHINGTON | MO4283192 | 21 AUCTION                            | June     | 6/29/2016  | 8/29/2016    |
| WEBSTER    | MO5213087 | FRATERNAL ORDER OF BEARS # 27         | June     | 7/13/2015  | 4/5/2016     |

Note: If no "Rescind Date", the boil order was still in effect at time of printing.



## 2016 Boil Water Orders

Issued due to acute MCL violations for the Total Coliform Rule and the Surface Water Treatment Rule



For current boil water orders, check the department's web page at [dnr.mo.gov/env/wpp/boil/index.html](http://dnr.mo.gov/env/wpp/boil/index.html)

## Appendix A: Health Based Compliance

### I. Total Coliform Rule

### B. Non-Acute MCL Violations

The following systems had two or more samples test positive for total coliform bacteria in the months indicated.

The positive samples were then tested for fecal coliform or E. coli and were found to be negative.

| County     | ID#       | System Name                             | Month(s)                 |
|------------|-----------|---|--------------------------|
| BARRY      | MO5203145 | FOX FITNESS 24                          | January, February        |
|            | MO5212841 | FRATERNAL ORDER OF EAGLE 4155           | March                    |
| BENTON     | MO3242078 | HEITS POINT LUTHERAN CAMP SYSTEM 1      | January                  |
| BOONE      | MO3036153 | KUHLE H2O                               | January                  |
| CAMDEN     | MO3212427 | LAKE BREEZE TERRACE                     | February                 |
| CAMDEN     | MO5293009 | THOMSONS COUNTRY STORE                  | January, February        |
| CEDAR      | MO5036164 | STOCKTON HILLS WATER CO                 | February                 |
|            | MO5282846 | AMERICAN VETERANS POST 116              | March                    |
| CHRISTIAN  | MO5036305 | PIPPINVILLE & OAK PARK OWNERS ASSN      | January, February        |
| DOUGLAS    | MO5171804 | MT ZION BIBLE SCHOOL                    | January                  |
| GASCONADE  | MO3031167 | BLACK FOREST HOA INC NO 2               | March                    |
| GREENE     | MO5271587 | TEMPLE ISRAEL                           | January                  |
| HICKORY    | MO5218044 | POMME DE TERRES SHADOW LAKE GOLF COURSE | January, February        |
| HOWELL     | MO4171176 | SOUTH FORK ELEM SCHOOL                  | March                    |
| JASPER     | MO5010004 | ALBA                                    | March                    |
|            | MO5180607 | DYNO NOBEL                              | January                  |
| JEFFERSON  | MO6036042 | FICKEN HILL SUBD                        | March                    |
| LINCOLN    | MO6240045 | CAMP TUCKAHO                            | March                    |
|            | MO6273193 | CHRIST CENTERED CHURCH                  | March                    |
| MARIES     | MO3180610 | KINGSFORD MANUFACTURING CO              | February                 |
| MILLER     | MO3212296 | TOOTERS SALOON & STEAKHOUSE             | February                 |
| MORGAN     | MO5031482 | THE VILLAS OF HARBOUR HILLS             | January, February, March |
| PULASKI    | MO3024490 | PULASKI CO PWSD 1                       | January                  |
| PULASKI    | MO4031631 | RIDGE CREEK WATER COMPANY LLC           | January, February        |
| SCOTT      | MO4010971 | HAYWOOD CITY                            | January                  |
|            | MO4031614 | NEW HAMBURG - CENTRAL                   | January                  |
| ST CHARLES | MO6282901 | CHANDLER HILL VINEYARD                  | February                 |
| ST CHARLES | MO6283166 | MONTELLE WINERY                         | January, February        |
| STONE      | MO5010192 | CRANE                                   | March                    |
|            | MO5031613 | SKYVIEW SUBDIVISION                     | March                    |
| STONE      | MO5043117 | WARRENS OAKLAND PARK                    | January                  |
| TANEY      | MO5031621 | GREEN ACRES HOMEOWNERS ASSOC            | January                  |
|            | MO5036117 | MOORE BEND WATER UTILITY, LLC           | February                 |
|            | MO5242466 | TRI LAKES MOOSE LODGE                   | March                    |
|            | MO5292575 | RAPID ROBERTS 121                       | March                    |
| WEBSTER    | MO5208114 | WILD ANIMAL SAFARI INC                  | January, February        |
|            | MO5213087 | FRATERNAL ORDER OF BEARS # 27           | January                  |
|            | MO5258117 | EAGLE STOP                              | January                  |

## Appendix A: Health Based Compliance

### II. Revised Total Coliform Rule - Level 1 and Level 2 Assessment Count

Since the transition to the Revised Total Coliform Rule April 1, 2016, the following systems have exceeded the coliform treatment technique trigger - triggering an assessment on more than one occasion in 2016. These assessments are triggered for the following reasons: systems collecting forty (40) or more samples per month exceeding 5.0% total-coliform positive samples for the month, systems collecting fewer than forty (40) samples per month having two (2) or more coliform-positive samples for the month, failing to collect every required repeat sample after any coliform-positive sample, or incurring an E coli MCL violation.

| County     | ID#       | System Name                             | Assessments |
|------------|-----------|---|-------------|
| BARRY      | MO5010730 | SELIGMAN                                | 2           |
| BENTON     | MO3048043 | DOUBLE M MOBILE COACH RANCH             | 3           |
| BUTLER     | MO4024071 | BUTLER CO PWSD 2                        | 2           |
| CAMDEN     | MO5303169 | ROANDA BEACH CONDOS                     | 2           |
| CAPE       | MO4079503 | MID AMERICA TEEN CHALLENGE              | 3           |
| CEDAR      | MO5172802 | AGAPE BOARDING SCHOOL                   | 2           |
| CRAWFORD   | MO6010200 | CUBA                                    | 2           |
| DADE       | MO5245232 | EVENING STAR CAMPGROUND                 | 2           |
| DOUGLAS    | MO5212925 | HITCHING POST BAR & GRILL               | 2           |
| FRANKLIN   | MO6024211 | FRANKLIN CO PWSD 1                      | 2           |
| FRANKLIN   | MO6036085 | SYLVAN MANOR SUBD                       | 2           |
| FRANKLIN   | MO6192601 | CEDAR CREEK CONFERENCE CENTER           | 2           |
| FRANKLIN   | MO6241626 | CAMP MO VAL CAMP TAMBO                  | 2           |
| GASCONADE  | MO6010360 | HERMANN                                 | 2           |
| GREENE     | MO5010032 | ASH GROVE                               | 2           |
| GREENE     | MO5024231 | GREENE CO PWSD 6                        | 2           |
| GREENE     | MO5258076 | BOLTONS GENERAL STORE                   | 2           |
| HICKORY    | MO5010197 | CROSS TIMBERS                           | 2           |
| LINCOLN    | MO6240045 | CAMP TUCKAHO                            | 3           |
| LINCOLN    | MO6273193 | CHRIST CENTERED CHURCH                  | 2           |
| MARIES     | MO3242408 | TURKEY HILL RANCH BIBLE CAMP            | 2           |
| MILLER     | MO3010240 | ELDON                                   | 2           |
| MORGAN     | MO3031358 | MORGAN CO PWSD # 2                      | 3           |
| MORGAN     | MO5301457 | MILLSTONE LUXURY CONDOMINIUMS           | 2           |
| NEWTON     | MO5010267 | FAIRVIEW                                | 2           |
| NEWTON     | MO5241734 | KOA CAMPGROUND                          | 2           |
| PETTIS     | MO3036065 | SOUTHERN HILLS WATER CO                 | 2           |
| POLK       | MO5031408 | BOLIVAR SOUTHTOWN UTILITIES COMPANY INC | 2           |
| POLK       | MO5036140 | PRAIRIE HEIGHTS SUBD                    | 2           |
| PULASKI    | MO3024491 | PULASKI CO PWSD 2                       | 2           |
| ST CHARLES | MO6073165 | WENTZVILLE VFW POST #5327               | 2           |
| ST CHARLES | MO6213173 | BALDUCCI VINEYARDS                      | 2           |
| STONE      | MO5283073 | KIMBERLING BOULEVARD                    | 2           |
| TANEY      | MO5242466 | TRI LAKES MOOSE LODGE                   | 3           |
| TANEY      | MO5243160 | BEAVER CREEK CANOE RENTAL, CAMPGROUND   | 2           |

## Appendix A: Health Based Compliance

### II. Revised Total Coliform Rule - Level 1 and Level 2 Assessment Count

Since the transition to the Revised Total Coliform Rule April 1, 2016, the following systems have exceeded the coliform treatment technique trigger - triggering an assessment on more than one occasion in 2016. These assessments are triggered for the following reasons: systems collecting forty (40) or more samples per month exceeding 5.0% total-coliform positive samples for the month, systems collecting fewer than forty (40) samples per month having two (2) or more coliform-positive samples for the month, failing to collect every required repeat sample after any coliform-positive sample, or incurring an E coli MCL violation.

| County     | ID#       | System Name              | Assessments |
|------------|-----------|--------------------------|-------------|
| TANEY      | MO5273121 | LIFE CHRISTIAN CENTER    | 2           |
| TANEY      | MO5292355 | WHITE OAK STATION # 21   | 2           |
| WARREN     | MO6010505 | MARTHASVILLE             | 2           |
| WASHINGTON | MO4201034 | FOURCHE VALLEY GOLF CLUB | 2           |
| WASHINGTON | MO6010659 | POTOSI                   | 4           |
| WEBSTER    | MO5010734 | SEYMOUR                  | 2           |



## Appendix A: Health Based Compliance

### III. Chemical MCL Violations

| County   | ID#       | System Name             | Chemical                      |
|----------|-----------|-------------------------|-------------------------------|
| ANDREW   | MO1010277 | FILLMORE                | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1010757 | ROSENDALE               | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1024006 | ANDREW CO PWSD 3        | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1024007 | ANDREW CO PWSD 4        | TOTAL TRIHALOMETHANE (TTHM)   |
| BARTON   | MO5010446 | LAMAR                   | TOTAL TRIHALOMETHANE (TTHM)   |
| BATES    | MO1010698 | ROCKVILLE               | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1021160 | BATES CO PWSD 7         | TOTAL HALOACETIC ACIDS (HAA5) |
|          | MO1021160 | BATES CO PWSD 7         | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1024034 | BATES CO PWSD 5         | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1024035 | BATES CO PWSD 6         | TOTAL TRIHALOMETHANE (TTHM)   |
| BUTLER   | MO4010656 | POPLAR BLUFF            | TOTAL HALOACETIC ACIDS (HAA5) |
|          | MO4010656 | POPLAR BLUFF            | TOTAL TRIHALOMETHANE (TTHM)   |
| CALDWELL | MO1024078 | CALDWELL CO PWSD 1      | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1024079 | CALDWELL CO PWSD 2      | TOTAL HALOACETIC ACIDS (HAA5) |
|          | MO1024079 | CALDWELL CO PWSD 2      | TOTAL TRIHALOMETHANE (TTHM)   |
| CARROLL  | MO2010215 | DEWITT                  | TOTAL TRIHALOMETHANE (TTHM)   |
| CASS     | MO1010024 | ARCHIE                  | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1010301 | GARDEN CITY             | TOTAL HALOACETIC ACIDS (HAA5) |
|          | MO1010301 | GARDEN CITY             | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1010261 | EXCELSIOR SPRINGS       | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1010546 | MOSBY                   | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1010748 | SMITHVILLE              | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1024143 | CLAY CO PWSD 3          | TOTAL TRIHALOMETHANE (TTHM)   |
| CLINTON  | MO1010131 | CAMERON                 | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1024155 | CLINTON CO PWSD 3       | TOTAL TRIHALOMETHANE (TTHM)   |
| COOPER   | MO3010075 | BLACKWATER              | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO3010089 | BOONVILLE               | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO3024170 | COOPER CO CONS PWSD # 1 | TOTAL TRIHALOMETHANE (TTHM)   |
| DAVIESS  | MO1010179 | COFFEY                  | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1010405 | JAMESON                 | TOTAL TRIHALOMETHANE (TTHM)   |
|          | MO1021080 | DAVIESS CO PWSD 2       | TOTAL TRIHALOMETHANE (TTHM)   |
| DEKALB   | MO1010510 | MAYSVILLE               | TOTAL TRIHALOMETHANE (TTHM)   |
| DUNKLIN  | MO4010379 | HORNERSVILLE            | ARSENIC                       |
| GENTRY   | MO1024223 | GENTRY CO PWSD 1        | TOTAL TRIHALOMETHANE (TTHM)   |
| GRUNDY   | MO2010452 | LAREDO                  | TOTAL TRIHALOMETHANE (TTHM)   |
| HARRISON | MO1024241 | HARRISON CO PWSD 1      | TOTAL TRIHALOMETHANE (TTHM)   |
| HENRY    | MO1010076 | BLAIRSTOWN              | TOTAL TRIHALOMETHANE (TTHM)   |

## Appendix A: Health Based Compliance

### III. Chemical MCL Violations

| County    | ID#       | System Name                  | Chemical                      |
|-----------|-----------|------------------------------|-------------------------------|
| HENRY     | MO1010123 | CALHOUN                      | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO1021117 | HENRY CO PWSD 3              | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO1021175 | HENRY CO PWSD 4              | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO1024247 | HARRY S TRUMAN PWSD 2        | TOTAL TRIHALOMETHANE (TTHM)   |
| HOLT      | MO1021304 | HOLT CO PWSD 1               | TOTAL TRIHALOMETHANE (TTHM)   |
| HOWARD    | MO2010271 | FAYETTE                      | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO2010566 | NEW FRANKLIN                 | TOTAL TRIHALOMETHANE (TTHM)   |
| IRON      | MO4010402 | IRONTON                      | TOTAL TRIHALOMETHANE (TTHM)   |
| JACKSON   | MO1010921 | UNITY VILLAGE                | TOTAL TRIHALOMETHANE (TTHM)   |
| JOHNSON   | MO1010371 | HOLDEN                       | TOTAL TRIHALOMETHANE (TTHM)   |
| LACLEDE   | MO5010458 | LEBANON                      | THALLIUM, TOTAL               |
| LAFAYETTE | MO1010839 | WAVERLY                      | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO1024326 | LAF/JO/SALINE CO CONS PWSD 2 | TOTAL TRIHALOMETHANE (TTHM)   |
| LEWIS     | MO2010440 | LAGRANGE                     | TOTAL TRIHALOMETHANE (TTHM)   |
| LINCOLN   | MO6031217 | TIMBER RIDGE ESTATES         | FLUORIDE                      |
| LINN      | MO2010472 | LINNEUS                      | TOTAL TRIHALOMETHANE (TTHM)   |
| MADISON   | MO4010290 | FREDERICKTOWN                | TOTAL HALOACETIC ACIDS (HAA5) |
|           | MO4010290 | FREDERICKTOWN                | TOTAL TRIHALOMETHANE (TTHM)   |
| MERCER    | MO2010515 | MERCER                       | TOTAL TRIHALOMETHANE (TTHM)   |
| NODAWAY   | MO1010173 | CLEARMONT                    | TOTAL TRIHALOMETHANE (TTHM)   |
| PERRY     | MO4024456 | PERRY CO PWSD 2              | TOTAL TRIHALOMETHANE (TTHM)   |
| PETTIS    | MO3021332 | PETTIS/JOHNSON/SALINE PWSD 1 | TOTAL TRIHALOMETHANE (TTHM)   |
| PIKE      | MO2010479 | LOUISIANA                    | TOTAL TRIHALOMETHANE (TTHM)   |
| PLATTE    | MO1010851 | WESTON                       | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO1024477 | PLATTE CO PWSD 3             | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO1024482 | PLATTE CO PWSD 8             | TOTAL TRIHALOMETHANE (TTHM)   |
| PUTNAM    | MO2010804 | UNIONVILLE                   | TOTAL HALOACETIC ACIDS (HAA5) |
|           | MO2024495 | PUTNAM CO PWSD 1             | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO2036165 | LAKE THUNDERHEAD             | TOTAL HALOACETIC ACIDS (HAA5) |
| RANDOLPH  | MO2036165 | LAKE THUNDERHEAD             | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO2010362 | HIGBEE                       | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO2010533 | MOBERLY                      | TOTAL TRIHALOMETHANE (TTHM)   |
| RAY       | MO1010454 | LAWSON                       | TOTAL TRIHALOMETHANE (TTHM)   |
| SALINE    | MO2010491 | MALTA BEND                   | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO2010502 | MARSHALL                     | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO2010520 | MIAMI                        | TOTAL TRIHALOMETHANE (TTHM)   |
|           | MO2010559 | NELSON                       | TOTAL TRIHALOMETHANE (TTHM)   |

## Appendix A: Health Based Compliance

### III. Chemical MCL Violations (continued)

| County   | ID#       | System Name      | Chemical                    |
|----------|-----------|------------------|-----------------------------|
| SALINE   | MO2010780 | SWEET SPRINGS    | TOTAL TRIHALOMETHANE (TTHM) |
|          | MO2024555 | SALINE CO PWSD 1 | TOTAL TRIHALOMETHANE (TTHM) |
|          | MO2024556 | SALINE CO PWSD 2 | TOTAL TRIHALOMETHANE (TTHM) |
|          | MO2024557 | SALINE CO PWSD 3 | TOTAL TRIHALOMETHANE (TTHM) |
| SHELBY   | MO2010165 | CLARENCE         | TOTAL TRIHALOMETHANE (TTHM) |
| ST CLAIR | MO5010020 | APPLETON CITY    | TOTAL TRIHALOMETHANE (TTHM) |
| WORTH    | MO1010739 | SHERIDAN         | TOTAL TRIHALOMETHANE (TTHM) |

### IV. Radiological MCL Violations

| County      | ID#       | System Name                           | Chemical                      |
|-------------|-----------|---------------------------------------|-------------------------------|
| BARRY       | MO5010968 | CHAIN O LAKES VILLAGE                 | GROSS ALPHA, EXCL. RADON & U  |
| IRON        | MO4010017 | ANNAPOLIS                             | GROSS ALPHA, EXCL. RADON & U  |
|             |           |                                       | COMBINED RADIUM (-226 & -228) |
| LINCOLN     | MO6010902 | SILEX                                 | COMBINED RADIUM (-226 & -228) |
| MCDONALD    | MO5010449 | LANAGAN                               | GROSS ALPHA, EXCL. RADON & U  |
|             |           |                                       | COMBINED RADIUM (-226 & -228) |
| OZARK       | MO5024444 | OZARK CO PWSD 1                       | GROSS ALPHA, EXCL. RADON & U  |
|             |           |                                       | COMBINED RADIUM (-226 & -228) |
| PERRY       | MO4024455 | PERRY CO PWSD 1                       | GROSS ALPHA, EXCL. RADON & U  |
|             |           |                                       | COMBINED RADIUM (-226 & -228) |
| ST FRANCOIS | MO4010087 | BONNE TERRE                           | COMBINED RADIUM (-226 & -228) |
|             | MO4010456 | LEADWOOD                              | GROSS ALPHA, EXCL. RADON & U  |
| TANEY       | MO4036059 | TERRE DU LAC                          | COMBINED RADIUM (-226 & -228) |
|             | MO5301550 | BRIARWOOD & REDBUD SHORES WATER ASSOC | GROSS ALPHA, EXCL. RADON & U  |

### V. Surface Water Violations

The following systems violated the Surface Water Rule, Treatment Technique for Turbidity or other surface water requirements in the months or annual period indicated.

| County  | ID#       | System Name   | Period                       | Violation                          |
|---------|-----------|---------------|------------------------------|------------------------------------|
| BUTLER  | MO4010656 | POPLAR BLUFF  | January-December             | Combined Filter Effluent Turbidity |
| COOPER  | MO3010089 | BOONVILLE     | October                      | Combined Filter Effluent Turbidity |
| DEKALB  | MO1010510 | MAYSVILLE     | February, June, August       | Combined Filter Effluent Turbidity |
| MADISON | MO4010290 | FREDERICKTOWN | October-December             | Combined Filter Effluent Turbidity |
| MARION  | MO2010344 | HANNIBAL      | May, October, November       | Combined Filter Effluent Turbidity |
| MONROE  | MO2010538 | MONROE CITY   | February, March, June-August | Combined Filter Effluent Turbidity |
| PIKE    | MO2010479 | LOUISIANA     | October, November            | Combined Filter Effluent Turbidity |

## APPENDIX B

### Chronic Major Monitoring Violations

The following systems had three or more major monitoring violations of the Total Coliform Rule or the Revised Total Coliform Rule in 2016.

| County         | System Name                       | PWS ID #  | Months   |
|----------------|-----------------------------------|-----------|--|
| ANDREW         | AMAZONIA                          | MO1010013 | March, June, July, August  |
|                | BUNGALOW TRAILER PARK             | MO1049097 | April, May, June   |
| BARRY          | FOX FITNESS 24                    | MO5203145 | April, June, July, August, September   |
|                | NONNAS NUMMIES                    | MO5213150 | October, November  |
| BENTON         | AMERICAN LEGION POST 217          | MO3281109 | January, April, August, December   |
|                | HIDDEN VALLEY MHP                 | MO3262156 | January, March, April, June, July, August  |
|                | T T CAMPGROUND                    | MO1242804 | January, February, March, April, May, June, July, August, September, October, November, December |
| BUTLER         | STOP & GO                         | MO4292680 | January, February, March, April, May, June, July, August, September, October, November, December |
| CAMDEN         | CAMDEN CO PWSD 1                  | MO3024090 | February, March, June, August  |
|                | NIANGUA FALLS                     | MO3218236 | June, October, December  |
|                | OSAGE VILLAGE INN                 | MO3191738 | April, May, July, August, September, October   |
|                | RED FOX BAR & GRILL               | MO3212446 | January, June, July, September   |
|                | Y ROAD GENERAL STORE              | MO3258017 | January, May, June   |
| CAPE GIRARDEAU | CLASS ACT FAMILY FITNESS          | MO4283006 | February, July, September  |
|                | EVENING STAR CAMPGROUND           | MO5245232 | January, February, March, April, May, June, July, August, September                              |
| DADE           | LUMBERYARD FAMILY RESTAURANT      | MO4213054 | June, July, August, September  |
| DENT           | PRO STOP                          | MO6292691 | May, June, July  |
| JEFFERSON      | HUNGRY HOUSE CAFE                 | MO5212682 | March, August, October   |
| LAWRENCE       | OLNEY TAVERN                      | MO6210657 | February, September, November  |
| LINCOLN        | LEGENDS RESTAURANT AND BAR        | MO5211235 | February, April, May   |
| MCDONALD       | BIKINI BAY                        | MO5213069 | January, March, May, November  |
| MILLER         | CALVARY CHAPEL LAKE OF THE OZARKS | MO5273082 | July, August, September  |
|                | CAMP BAGNELL                      | MO3241749 | January, June, November, December  |
| MONTGOMERY     | DANVILLE SINCLAIR                 | MO3291410 | April, May, June, July   |
| NEWTON         | C MART                            | MO5292823 | August, November, December   |
| PERRY          | BILLS PLACE                       | MO4218555 | June, August, December   |
| PETTIS         | CAMP BRANCH BAPTIST CHURCH        | MO1272873 | April, July, September, October  |
|                | CRESTVIEW MHP                     | MO3048254 | January, April, November   |
|                | WOODCREST MHP                     | MO3048127 | February, March, April, May, June, July  |
| PHELPS         | PLANTATION ESTATES                | MO5030019 | August, September, October, November, December   |
| POLK           |                                   |           | January, August, September, October  |
| PULASKI        | RIDGE CREEK WATER COMPANY LLC     | MO4031631 | January, February, May, June, July, August, September, October, November, December               |
| ST CHARLES     | CHANDLER HILL VINEYARD            | MO6282901 | April, May, June, July, August, September, October, November, December                           |
| ST CLAIR       | SCOTTS ICONIUM STORE              | MO5258124 | March, September, October, November  |
| STONE          | CROSS ROADS STORE                 | MO5292589 | April, July, September   |
|                | SKYVIEW SUBDIVISION               | MO5031613 | January, February, March, April, May, June, July, August, September, October                     |
|                | ROGUE CREEK UTILITIES             | MO4036318 | January, February, July, October   |
| WASHINGTON     | EAGLE STOP                        | MO5258117 | February, June, December   |
| WEBSTER        | XP0 LOGISTICS                     | MO5182621 | February, May, November  |



## Appendix C

### Major Repeat Monitoring Violations

The following systems had major repeat monitoring violations for the months listed. A major repeat monitoring violation occurs when a routine sample tests positive for total coliform bacteria and that system fails to submit any follow-up, or repeat, samples as required.

| County     | ID#       | System Name            | Month(s) |
|------------|-----------|------------------------|----------|
| CAMDEN     | MO3190694 | EL KAY LAKE VIEW MOTEL | January  |
|            | MO3212427 | LAKE BREEZE TERRACE    | January  |
| HICKORY    | MO5293126 | ALPS GROCERY PITTSBURG | February |
| PHELPS     | MO3048127 | WOODCREST MHP          | January  |
| ST CHARLES | MO6282901 | CHANDLER HILL VINEYARD | March    |
| TANEY      | MO5242466 | TRI LAKES MOOSE LODGE  | January  |



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